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ABSTRACT

A study was conducted in 1972-73 in Berkeley, Rome, Dubrovnik, and Istanbul, in order to examine the differences and similarities in the sequence of the development of locative expressions in English, Italian, Serbo-Croatian, and Turkish. The subjects consisted of 48 two-, three-, and four-year-olds in each field site. Groups of three girls and three boys were tested at each of eight age levels, and each child was re-tested four months later. The experimenter, in each case a female native speaker, placed objects on a table and elicited locative expressions from each child. Seven expressions were investigated, corresponding to the English "in," "on," "under," "beside," "between," "in back," and "in front." The total number of different locative notions expressed by each child was counted and correlated with language, age, sex, and time factors. The Guttman scaling procedures were used to establish the order in which each notion was learned in each language. Results suggest that the course of acquisition of these locative expressions in these children includes both cross-linguistic similarities and differences which can be explained by a complex interaction of conceptual difficulty, cognitive salience, and linguistic complexity. (AM)

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THE DEVELOPMENT OF LOCATIVE EXPRESSIONS IN ENGLISH,
ITALIAN, SERBO-CROATIAN, AND TURKISH

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The usefulness of a cross-linguistic approach to the study of language development was proposed by one of us (Slobin, 1971) in a paper on "cognitive prerequisites for the development of grammar." The present study represents one part of a large, cross-linguistic investigation derived from that proposal.¹ Briefly, we expected a roughly universal sequence in the development of the underlying notions expressed linguistically by the child, as a reflection of universals of cognitive development interacting with standard communicative settings. Languages differ—at least for the preschooler—not so much in what can be said, but in how things are to be said. Accordingly, cross-linguistic discrepancies in development should be attributable to differences in the degree of formal complexity, as imposed by the grammar of the language, on the expression of common underlying notions. In tracking the ontogeny of linguistic development within a given content domain—in this case, the expression of locative notions—we expected to find similar courses of development across languages on cognitive grounds. However, on the basis of differences in the means for mapping underlying notions onto surface utterances, we expected cross-linguistic differences. In the present study we report both similarities in the development of the means of expressing locative notions in four languages, and differences based on structural features of each of the languages.

METHOD

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The study was conducted in 1972-73 in Berkeley, Rome, Dubrovnik, and Istanbul, picking research sites in which the languages to be acquired contrast on a number of psycholinguistically interesting dimensions. The three Indo-European languages—English, Italian, and Serbo-Croatian—are prepositional subject-verb-object languages, ranging from the non-inflectional, fixed word order character of English to the highly inflectional and much freer word order character of Serbo-Croatian. Turkish, by contrast, is postpositional, agglutinative, subject-object-verb—similar in many respects to Japanese, Korean, Quechua, and other languages of that type. Of the four languages studied, Turkish has the greatest flexibility of word order.

1. The investigation was designed in collaboration with Ayhan Aksu, Francesco Antinucci, Thomas G. Bever, Susan Ervin-Tripp, and Ljubica Radulović, with support from the Grant Foundation to the Institute of Human Learning and from NIMH to the Language-Behavior Research Laboratory, University of California at Berkeley.

In regard to the development of children's abilities to express locative notions, we are especially interested in the contrast between prepositions and postpositions, the relations between these adpositions and case inflections, and the degree of lexical diversity in the locative domain.

Our plan was to study matched samples of two-, three-, and four-year olds in the four countries, with 48 children in each field site. By and large, we completed this plan, though there are gaps in the data at various points, due to the tribulations of carrying out research in foreign countries with a limited time schedule. Table 1 presents a summary of the subject sample participating in this phase of the investigation, which was part of a large battery of tests. We worked with groups of six children—three boys and three girls—at each of eight age levels, spaced at four-month intervals between 2;0 and 4;4. In addition to this cross-sectional design, each child was retested four months later, providing one longitudinal check, and giving an overall range of 2;0 to 4;8. Since we were interested in cross-linguistic, and not cross-cultural factors, we tried, as much as possible, to equate our samples on cultural grounds. That is, we limited ourselves to children of urban, professional parents, at least one of whom had a college degree. By and large, we feel that we were working with a fairly homogeneous group of children across the four field sites, at least in terms of early material and intellectual experience. Each child was studied extensively, over a period of 15-20 hours, within a ten-day span. The experimenter was always female, and always a native speaker.

Table 1. Number of Subject Contributing to
Locative Elicitation Data at Time I and Time II

Group	Age		English		Italian		S-C		Turkish	
	I	II	I	II	I	II	I	II	I	II
A	2;0-2;4	2;4-2;8	7	10	9	8	12	8	7	9
B	2;8-3;0	3;0-3;4	10	11	12	8	12	10	8	8
C	3;4-3;8	3;8-4;4	12	12	12	6	12	12	10	9
D	4;0-4;4	4;4-4;8	12	12	11	8	12	12	11	8

In addition to the locative elicitation measure reported here, similar data were gathered in a locative comprehension test, which will be summarized in a following publication. It is worth pointing out here, however, that the patterns of production and comprehension are similar, with comprehension almost always ahead of production.

Below are presented brief summaries of the relevant linguistic distinctions between the four languages in regard to locative expressions with adpositions (pre- or postpositions).

English

§ English is prepositional, with uninflected articles and nouns inflected only for number. There is no grammatical gender.

§ There is a high degree of synonymy, or lexical diversity, as in the terms behind and in back of for the same notion; in, into, inside, and inside of; etc.

§ Whereas some terms have a clear etymology (e.g., in back, in front, beside), many are semantically opaque except to the educated adult (e.g., behind, between).

§ Many terms are compounds of two, three, or even four morphemes (e.g., inside of, on top of, in back of, in front of, next to).

Italian

§ Italian is prepositional, with articles and nouns inflected for two genders and number. Some prepositions have contracted forms with articles, e.g.

in 'in'
nel 'in the' [masculine singular]
nella 'in the' [feminine singular]
nei / negli 'in the' [masculine plural]
nelle 'in the' [feminine plural]

§ There is little lexical diversity; each locative notion is expressed by one, or occasionally two terms.

§ Prepositions are generally semantically opaque (e.g., dietro 'in back' is distinct from the body part term schiena 'back').

§ Some terms are compounds (e.g., davanti a 'in front of', dietro a 'in back of').

Serbo-Croatian

§ Serbo-Croatian is prepositional, with no articles. Nouns are inflected for seven cases, three genders, and number, with much irregularity. The preposition requires case agreement with the following noun, but the grounds often seem arbitrary. A locative preposition, depending on which one, can take the genitive, dative, accusative, instrumental, or (occasionally!) the locative case.

§ Some prepositions require different case endings for static and dynamic referents. For example, one preposition meaning 'in front', pred, takes the instrumental case to describe a static scene (e.g., pred kućom 'in front of the house') but the accusative to describe directed movement (e.g., Idi pred kuću 'Go to the front of the house'). A related preposition, however, ispred, also means 'in front', but it always takes the genitive (e.g., ispred kuće 'in front of the house') and is generally used only for static configurations.

§ There are many synonymous terms (e.g., adjacency can be expressed, in the Croatian dialect of Dubrovnik, with the prepositions blizu, kraj, kala, pokraj, and pored).

§ Prepositions are almost always semantically opaque.

§ There are some compound terms (e.g., u sredini 'in the middle'; kraj 'beside' vs. pokraj 'alongside').

§ There are distinct prepositional and adverbial forms. For example, in English one can say He's in back of the house and He's in back. In Serbo-Croatian, the first form is prepositional, using the preposition iza, with obligatory mention of a reference object; the second requires a locative adverbial, natrag or otraga, with mention of reference object disallowed.

Turkish

§ Turkish is postpositional with no articles and no grammatical gender. There are regular, exceptionless inflectional paradigms, with standard adjustments for vowel harmony. Case and number are expressed by separate, agglutinative particles, e.g.

<u>ev</u> 'house'	<u>evler</u> 'houses'
<u>evde</u> 'in (the) house'	<u>evlerde</u> 'in (the) houses'
<u>eve</u> 'to (the) house'	<u>evlere</u> 'to (the) houses'
<u>evden</u> 'from (the) house'	<u>evlerden</u> 'from (the) houses'

(The basic nominal inflections for location, movement towards, and movement away from are all acquired well before age two, with the full set of inflectional particles. The development presented in this study is that of the postpositions, and not the inflectional particles.)

§ Locative postpositions are all semantically transparent i.e., etymologically clear) and are formed from grammatical possession of nominal locative features. There are no synonyms.

ic 'interior' → icinde 'in', 'inside'

<u>ev-</u>	<u>in</u>	<u>ic-</u>	<u>in-</u>	<u>de</u>
'house'	'genitive'	'interior'	'possessive'	'located at'
				'in (the) house'

üst 'top surface' → üstünde 'on', 'on top', 'above'

alt 'underside', 'under space' → altında 'under'

arka 'back' [body part] → arkasında 'behind', 'in back of'

ön 'front' [body part] → önünde 'in front of'

yan 'side' → yanında 'beside', 'next to'

orta 'center' → ortasında 'in the middle'

ara 'interval', 'gap' → arasında 'between'

Procedure for Locative Production Task

Experimenter and child sat at the same side of a table. The experimenter would place a reference object in front of the child (e.g., a small plate) while naming the object; a named standard object would then be placed in relation to the reference object (e.g., a stone next to the plate), and the child would be asked: "Where is the stone standing?" The use of locative terms was stimulated and modeled in a warm-up period, but some of the youngest children had difficulty going beyond general deictic responses (e.g., pointing, saying "there"). A variety of probes were used to encourage children to give specific

locative responses on the elicitation test and, with varying success, it was possible to elicit some locative terms from most subjects.

Seven locative notions were investigated, corresponding to the English terms in, on, under, beside, between, in back, and in front. The items are summarized in Table 2, on the following page. The standard object was always small and unoriented—a nut, a stone, a toy bottle, a toy can, a wooden bead. There were two parallel test forms of 14 items each, presented on separate days. Each test form had six orders, one for each child in an age group. As shown in Table 2, back and front items were most numerous. This is because we were interested in comparing children's use of these terms with fronted and non-fronted objects—that is, objects like trucks and houses, which have inherent fronts and backs, and objects like blocks, glasses, and plates, which have no inherent fronts and backs. We will refer to the trucks and houses as "featured" objects. In all four languages, the terms for 'front' and 'back' are homonyms, in that they can encode both the featured location (at the front end of a truck, wherever the speaker may be) and the non-featured (between the speaker and the truck, whichever direction the truck may be facing).

Table 2 presents the range of semantically correct responses offered by our subjects. Responses without mention of the reference object were accepted as correct (e.g., "behind," "in the middle"). Although these are child responses, they represent almost a complete sampling of the lexical options available in each of the languages for encoding these referent situations. The considerable differences between the languages in degree of lexical diversity is evident, with English and Serbo-Croatian showing a great range of possible responses, and Italian and Turkish much closer to a one-to-one relation between locative notion and surface expression.

RESULTS

Our major analyses took two forms. First, as a general measure of locative knowledge, we counted the total number of different locative notions expressed by each child, and analyzed these scores for the effects of language, age, sex, and time (Time I and Time II of testing). Then, to look at patterns of locative acquisition, we used Guttman scaling procedures to establish the order in which particular locative notions were learned in each language. The first analysis focuses on the task of locative expression as a whole, exploring sex differences, developmental trends, longitudinal changes, and the relative difficulty of this task from one language to the next. The second analysis focuses on the acquisition of specific adpositions, establishing their relative difficulty within as well as between languages.

The first, general comparison was conducted as an analysis of variance on each child's total score for the locative production task. Children were given credit for expressing a locative notion

Table 2. Test Items and Correct Locative Adpositional Responses in Each Language

Configurations: (1) IN [basket, park], (2) ON [bridge, box], (3) UNDER [bridge, hand], (4) BEHIND (a) at backside of laterally placed featured object [truck, house], (b) at opposite side [truck, house], (c) at opposite side of non-featured object [box, glass], (5) IN FRONT (a) at frontside of laterally placed featured object [truck, house], (b) at near side [truck, house], (c) at near side of non-featured object [box, glass], (6) BESIDE (a) at right side of non-featured object [block, glass], (b) at left side [block, glass], (7) BETWEEN (a) two close matching objects [glasses, blocks], (b) two close disparate objects [bottle and block, cup and glass], (c) two distant matching objects

<u>Configuration</u>	<u>Language</u>			
	English	Serbo-Croatian	Italian	Turkish
1. IN	in, inside (of)	u, unutra	in/nel, dentro	içinde
2. ON	on, on top (of)	na, nad, na vrh	su(1), sopra	üstünde
3. UNDER	under, underneath	pod, ispod	sotto	altında
4. BEHIND	behind, in back (of)	iza, izada, natrag, otraga	dietro (a)	arkasında
5. IN FRONT	in front (of)	pred, ispred, spreda, napred, osprijeda	davanti (a)	önünde
6. BESIDE	beside, by, near, next to, close to	blizu, kraj, kala, kod, pokraj, pored	vicino (a)	yanında
7. BETWEEN*	between / in the middle (of)	među, između / u sredini	tra / in mezzo (a)	arasında / ortasında

* Both "between" and "in the middle" were accepted as responses to these items.

if they produced it more often in appropriate contexts than in inappropriate ones. For example, an English-speaking child who correctly described both UNDER configurations as instances of "under" would receive credit for expressing this notion even if he used "under" incorrectly to describe one of the BEHIND configurations. He would not receive credit if he used "under" incorrectly two or more times. A child's total score was the number of different locative notions for which he received credit.

The ANOVA on this measure was conducted with a repeated-measures design: three factors between subjects (4 language X 4 age X 2 sex) and one factor within subjects (2 time). (Only those children with both Time I and Time II data were included in this analysis. Numbers of subjects in age groups A-D for each language were: English—6, 9, 12, 12; Italian—8, 8, 7, 8; Serbo-Croatian—8, 10, 12, 12; Turkish—6, 6, 8, 8.) All main effects and two interactions (Language X Age and Language X Time) were significant with $p < .01$. Supplementing these omnibus tests with Scheffé post hoc comparisons ($\alpha = .05$) as necessary, our main effects data indicate that: (1) children in each successively older age group produced more locatives than those in the previous group; (2) girls produced more locatives than boys; (3) children improved their performance during the four month interval; and (4) children learning Turkish or Italian produced more different locative notions than those learning English or Serbo-Croatian.

Analysis of the significant interactions further illuminates these main effects. In regard to the Language X Age interaction, it is particularly the Italian and Turkish children of age groups B and C (32-48 months) who expressed more locative notions than their English and Serbo-Croatian speaking peers. The statistically significant comparison here is between the Italian and Turkish children of age group C and the English and Serbo-Croatian children of group B (Scheffé, $\alpha = .05$). As for the Language X Time interaction, the four month gain in locative performance varied from language to language: Italian children gained the most (with an average of 2.045 new locatives expressed at Time II), then the Turks (1.332), then the Americans (.636), and last, the Yugoslavs (.202). (Significant Scheffé contrast, $\alpha = .05$: Italian + Turkish > English + Serbo-Croatian.) This trend held true within each age group as well as across ages. The low Serbo-Croatian gain resulted in particular from the relatively large number of children who performed less well at Time II than at Time I.

In summary, the ANOVA suggests that a child's ability to produce locatives is affected by his age, his sex, and the language he is learning. Our next analysis will allow us to examine linguistic factors in more detail.

Guttman scaling procedures were used to look at the order in which particular locative notions were learned in each language. This technique provides a measure of the certainty with which one can predict the specific locatives any child knows, given his total score. Combining the Time I and Time II data for each language, we found that the

English, Turkish, and Italian children did acquire locatives in a predictable order, and that the Yugoslav children's performance was marginally predictable. Separate analyses of the Time I and Time II data yielded comparable results. Table 3 lists the presumed underlying order of acquisition for each language as well as the percentage of children succeeding on each locative. These scales reveal both cross-linguistic similarities and differences. It is always the case that IN, ON, UNDER, and BESIDE are learned prior to BETWEEN, and BACK/FRONT with featured objects. These in turn always precede BACK and FRONT with non-featured objects. Within these three locative groups, however, there is some variation in order from language to language. (Upper-case terms are meant in a generic sense, and represent a range of expressed lexemes; lower-case f subscript refers to featured objects.)

Table 3. Order of Acquisition of Locative Expressions in Four Languages and Percentage of Subjects Producing Each.
(Time I and Time II Data Combined)

Scale Point	ENGLISH		ITALIAN		SERBO-CROATIAN		TURKISH	
	Locative	%	Locative	%	Locative	%	Locative	%
1	IN	90	IN	91	ON	88	IN	90
2	ON	83	ON	88	IN	84	ON	80
3	UNDER	81	UNDER	84	BESIDE	82	UNDER	79
4	BESIDE	74	BESIDE	77	UNDER	72	BESIDE	79
5	BETWEEN	49	BETWEEN	57	BACK _f	31	BACK _f	71
6	FRONT _f	30	BACK _f	42	BETWEEN	26	FRONT _f	53
7	BACK _f	21	FRONT _f	41	FRONT _f	19	BETWEEN	50
8	BACK	14	BACK	23	BACK	16	BACK	7
9	FRONT	3	FRONT	18	FRONT	12	FRONT	4
Guttman Coefficient of Reproducibility								
		.93		.89		.86		.91
Number of Subjects								
	86		74		90		70	

As a further analysis of the scale data, we calculated the average age and proportion of children at each scale level. For example, in English, the fourth locative notion to be learned is typically BESIDE. Twenty-four percent of the English sample was at scale point 4. These children produced BESIDE, but no higher level locatives. Their average age was 39 months. Table 4 summarizes such facts for each language, focusing in particular on the second group of locatives, i.e., those which these samples of children were most actively learning. As one would expect in a developmental scale, children at higher scale points tend to be older. More importantly, Table 4 makes it possible to give specific interpretations to our earlier analysis of total scores.

Table 4. Average Age in Months and Proportion of Subjects at Each Locative Scale Point

Scale Point	ENGLISH			ITALIAN			SERB-CR.			TURKISH		
	Loc.	Age	%	Loc.	Age	%	Loc.	Age	%	Loc.	Age	%
1-3			24			15			21			14
4	BES.	39	24	BES.	32	16	UND.	38	26	BES.	36	9
5	BET.	42	20	BET.	41	18	BA _f	45	9	BA _f	34	11
6	FR _f	46	5	BA _f	35*	8	BET.	46	13	FR _f	40	10
7	BA _f	52	12	FR _f	46	16	FR _f	46	12	BET.	45	44
8-9	BA/FR		15	BA/FR		27	BA/FR		19	BA/FR		11

* N=6. 4/6 do not know BETWEEN: the remaining 2 are age 40 mon.

Looking back at the relative advancement of the Turkish and Italian subjects in the light of Table 4, we find that the 32-40 month advantage of the Turkish subjects is linked to their early acquisition of BACK with featured referent objects. The 40-48 month advantage of the Italian subjects reflects the high percentage of children who advanced beyond the second group of locatives and expressed BACK and FRONT in their non-featured contexts. This is in contrast to the Turkish subjects who clearly do not make this advance despite their early successes. The relatively low total performance of the English and Serbo-Croatian samples stems from the large percentage of children who failed to express any of the second group of locatives, and from the fact that English and Serbo-Croatian children at scale points 4-7 tend to be older than Turkish and Italian children at comparable scale points. Although the Yugoslavian children learning BETWEEN, BACK_f, and FRONT_f are generally the same ages as the American children learning these locatives, the respective scale pictures are quite different. The responses of the American children at this stage scale perfectly, but the Yugoslav children are inconsistent. Moreover, they make many more substitution errors than children learning other languages. The proportions of responses which are substitutions of one locative adposition for another, taking each of the languages separately, are: Turkish—20%, Italian—28%, English—36%, Serbo-Croatian—46%.

Finally, interest in the relative "salience" or "polarity" of locative notions prompted us to look specifically at BACK and FRONT substitution errors. Table 5 indicates that children in each language group tended to express BACK in contexts requiring FRONT more often than they used FRONT in BACK contexts.

Table 5. Back/Front Substitution Errors

Object Configuration	Verbal Response	Number of Responses			
		English	Italian	Serb-Cr.	Turkish
Object BEHIND	<u>in front</u>	12	6	31	19
Object IN FRONT	<u>behind</u>	19	33	50	23

To summarize briefly, the results of the analysis of variance and the scale analysis suggest the following picture. Between the years of 2;0 and 4;8, English, Italian, Serbo-Croatian, and Turkish speaking children build a repertoire of adpositional locative expressions. The course of acquisition—at least for the locatives we tested—seems to include both cross-linguistic differences and similarities. Children in all language groups learned locative adpositions in a consistent order. The exact order of acquisition was language specific, but there was also a general order of acquisition which spanned across language groups: IN, ON, UNDER, BESIDE < BACK_f, FRONT_f, BETWEEN < BACK, FRONT. Italian and Turkish children seem to learn these locatives more quickly, and at earlier ages than their English and Serbo-Croatian speaking peers. In general, they command a larger repertoire, make fewer substitution errors, and can learn more terms in a four month period.

DISCUSSION

It seems that the present findings can be best explained by a complex interaction of determining factors: conceptual difficulty, cognitive salience, and linguistic complexity. Below we discuss each factor in turn, particularly in regard to acquisition of the second group of locatives.

First we have the primary role of conceptual growth in motivating and enabling the discovery of semantic maps. Although it is difficult to specify the exact conceptual base for each of the locative expressions we studied, there seems little doubt that the relations underlying BETWEEN, BACK_f, and FRONT_f are elaborations of the basic proximity relation underlying BESIDE. BACK_f and FRONT_f require a specification of object features, and BETWEEN requires a coordination of two proximity relations (Piaget and Inhelder, 1967). Research in object feature specification (Masongkay, et al., 1974) and proximity coordination (Braine, 1959; Piaget and Inhelder, 1967) suggests that the latter is developmentally more advanced. If basic conceptual complexity were the sole determinant of acquisition, we would expect locatives to appear in the order: BESIDE < BACK_f, FRONT_f < BETWEEN.

A second determining factor can be thought of as cognitive salience, that is, the relative functional utility or likelihood of discovery characteristic of any relation. The child's focus on disappearing or inaccessible objects, together with the improbability of asking about the location of a visible object, suggest that, all things equal, the relation BACK will have this quality of salience. On cognitive grounds, then, the middle level locatives should have been acquired in the order BESIDE < BACK_f < FRONT_f < BETWEEN. The children in our study did learn BESIDE before the others, and BACK_f typically preceded FRONT_f. But what of the many deviations from this basic order.

The availability of conceptual resources in no way guarantees the discovery of expressive means. Cognitive growth establishes the limits within which specific linguistic factors can promote or impede the child's search for semantic regularity. In our earlier characterization

of locatives in the four languages we mentioned several such factors: degree of homonymy, degree of synonymy, degree of surface morphological complexity, degree of etymological clarity, and post- or pre-positionality. Table 6 summarizes these characterizations for our second level locatives.

Wherever a linguistic fact about a locative seems to assist or impede the learning of that form a +1 is entered. (Judgments of morphological complexity were made relative to the locative system within each language.) Violating all measurement rules in the interest of discover, we then total the values earned by each locative. These sums, listed in the right hand column, suggest the relative difficulty of linguistic processing of each adposition—zero or positive integers indicate low difficulty, negative integers indicate increased degrees of difficulty.

Table 6. Relative Difficulty of Linguistic Processing of Locative Adpositional Systems

Language	Adposition	Homonymy	Synonymy	Pre- or Post-Position	Morphological Complexity	Clear Etymology	TOTAL
TURKISH	arkasında [BA]	-1				+1	0
	önünde [FR]	-1				+1	0
	ortasında [MID]					+1	+1
	arasında [BET]					+1	+1
ITALIAN	dietro a [BA]	-1		-1	-1		-3
	davanti a [FR]	-1		-1	-1		-3
	in mezzo [MID]			-1	*	+1	0
	tra [BET]			-1			-1
ENGLISH	in back of	-1	-1	-1	-1	+1	-3
	behind	-1	-1	-1			-3
	in front of	-1		-1	-1		-3
	in the middle			-1	*	+1	0
	between			-1			-1
SERB-CR.	iza [BA]	-1	-1	-1			-3
	izada [BA]	-1	-1	-1	-1		-4
	pred [FR]	-1	-1	-1			-3
	ispred [FR]	-1	-1	-1	-1		-4
	u sredini [MID]			-1	*	+1	0
	među [BET]			-1			-1
	između [BET]			-1	-1		-2

* These terms do not require nounphrase objects, so remain morphologically simple.

If we knew how to weight these factors or measure their extent, we might produce a more strongly differentiated picture, but even this initial effort is suggestive. Looking first within language:

(1) Wherever cognitive complexity fails to predict actual order of acquisition, we find some pocket of relative difficulty of linguistic processing. In English and Italian, for example, although BACK_f and FRONT_f are conceptually easier than BETWEEN, they incorporate greater linguistic complexity. (2) Wherever linguistic processing difficulty fails to predict actual order of acquisition, we can argue for relative cognitive complexity. In Turkish and Serbo-Croatian, although the lexemes for BETWEEN are relatively easy linguistically, they require greater conceptual sophistication.

These generalizations apply less well across languages, perhaps because we have isolated adpositional locatives from their larger language development context. It is true that the Turkish second level locatives, i.e., BACK_f, FRONT_f, and BETWEEN, evidence the least linguistic difficulty of all and are learned in the order predicted by cognitive complexity. However, it is also true that although the linguistic difficulty of BACK_f seems comparable in Serbo-Croatian, Italian, and English, this preposition is acquired at different points in these three developmental scales. Clearly, the model presented here needs further elaboration.

The influence of specific linguistic factors may be more complex than first imagined. We have assumed that lexical diversity affects the rate of acquisition of terms, and Table 6 provided some support for this assumption. One mechanism of this effect is suggested by the data on substitution errors. The two languages which have few or no synonymous adpositions, Turkish and Italian, are low in substitution errors; English is more extreme in both synonymy and substitution errors; Serbo-Croatian is most extreme on both dimensions. Perhaps lexical diversity encourages a guessing strategy: if there are many overlapping terms, the child cannot be sure of what the precise meaning of each may be. He/she may well be led to search for meaning differences between the terms, resulting in false hypotheses and prolonged patterns of confused acquisition. If, on the other hand, the language presents the child with something closer to a one-to-one mapping between locative notion and adposition—with the concomitant greater frequency of occurrence of each individual term—he/she may be more likely to wait until having figured out the appropriate meaning of each new term. That is, each term, as it is acquired, may have a more stable meaning, decreasing the probability that it will be substituted for another.

The weak scale properties of the Serbo-Croatian data suggest another intriguing area for study. Deviations from a presumably scalar pattern of acquisition might be due to performance instability inherent in a difficult subsystem. However, another explanation seems more interesting. Children acquiring difficult linguistic subsystems may experience lengthy intervals between their acquisition of conceptual judgments and expressive means. The exact nature and consequences of such intervals need

exploration, but they may well lead to greater individual variation in acquisition order—because there would be more unlexicalized notions "waiting" for expression.

Slobin (1971) has suggested that: "New forms first express old functions, and new functions are first expressed by old forms." In the present study correct use of a locative term was frequently preceded by substitutions and circumlocutions using known linguistic forms. Such transient old forms expressing new functions can be most clearly seen in children's responses to BETWEEN items on the elicitation test. BETWEEN is acquired at a time when the child already has a number of locative terms, making it possible to observe the expression of a semantic notion in the "waiting room" before the appropriate new form emerges. BETWEEN is cognitively complex in that it—alone among the adpositions—requires one to take account of two reference objects. For many children, in all four languages, there seems to be a stage at which the child realizes the necessary plurality of reference objects, but has not yet acquired the appropriate term. Here we see several intermediate strategies. A common response is to use some other locative term, generally BESIDE or IN, with a plural noun. For example, an object is placed between two blocks and the child says "beside the blocks" or "in the blocks," thus indicating his grasp of the plurality of the reference objects. This strategy is often replaced by the use of "in the middle," which acknowledges the sense of enclosure better than the use of "in," but does not capture the duality of the reference objects. Often, when "between" emerges, it appears with a singular noun, "between the block," as if the child has decided that this peculiar proposition already encodes plurality, without redundant marking on the noun. Thus the child has an ability to make use of linguistic means at his disposal while "waiting" to master the adult forms for particular notions.

The major factor which seems to influence time spent in the "waiting room," as well as what happens there, is complexity of the mapping from underlying notions to surface expressions. The waiting room provides a metaphor for our entire line of cross-linguistic research: The child enters the room when he discerns, primarily on non-linguistic grounds, that a given notion can be expressed in speech. The entry is thus determined by conceptual acquisition of the sort generally referred to as cognitive development. The problems to be solved in the waiting room are both semantic and morphologico-syntactic. The child must figure out just what aspects of the particular notion are encoded in his language, and what means are used for the encoding. He/she leaves the waiting room when these "semantactic" problems are solved. We have tried to show how both conceptual and semantactic factors interact in the course of children's developing ability to speak about the locations of objects relative to one another. It is our hope that similar stories can be told about other conceptual domains and their symbolic expression in various languages.